A Watershed Conditions Report For the State of Kansas
HUC 11030014
(North Fork Ninnescah) Watershed

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Watershed Conditions Report
For
HUC 8 11030014 (North Fork Ninnescah)

Prepared by
Kansas Department of Health and Environment (KDHE)
Nonpoint Source Section
12/22/00

EXECUTIVE SUMMARY

This Watershed Conditions Report is designed to serve as a water quality "atlas", and is intended to provide stakeholders in water quality with a tool to assess the condition of water resources within their watershed. Surface water quality for HUC 8 11030014 streams and rivers is generally in good condition with majority of the surface water bodies supporting their designated uses.

Cheney Reservoir and many smaller city and county lakes are located within HUC 8 11030014. The primary pollutant concern for Cheney Reservoir within the watershed is eutrophication. Eutrophication is a natural process which creates conditions favorable for algae blooms and excess plant growth. This process is often accelerated by excess nutrient loading from the watershed. An additional pollutant concern for lake Cheney is silt loading. Silt loading is a result of erosion as the bare soil enters the water body and settles to the bottom. Silt decreases water clarity and eventually decreases water storage capacity. Silt also carries phosphorous into the water body, which can accelerate eutrophication.

Groundwater resources in HUC 8 11030014 include alluvial aquifers of the Ninnescah River and the High Plains and Dakota aquifers. Water from these aquifers is generally in good condition with naturally occurring minerals and nitrate as the primary pollutant concerns.

PURPOSE

The Watershed Conditions Report is designed to serve as a water quality "atlas" for a given watershed, and is intended to provide Watershed Stakeholders Committees (WSC) with a tool to assess the condition of water resources within their watershed.

BACKGROUND

The Clean Water Act mandates that States assess the quality of their waters and implement Total Maximum Daily Loads (TMDLs) for water bodies that do not meet their designated uses. The following is a summary of steps taken by the State of Kansas to comply with these requirements of the Clean Water Act.

The Kansas Department of Health and Environment (KDHE) prepared the Kansas Unified Watershed Assessment in 1998. This assessment classifies the State's watersheds into four categories. A Category I classification means the watershed is in need of restoration due to having water quality impairments or degradation of other natural resources related to an aquatic habitat, ecosystem health and other factors related to aquatic life resources. Category II watersheds are in need of protection. Category III are watersheds with pristine or sensitive aquatic system conditions on lands administered by federal, state, or tribal governments. Category IV watersheds are those for which there is insufficient data to make accurate classification. KDHE has assigned a restoration priority score to each Category I watershed.

As mandated by section 303(d) of the Clean Water Act, lakes and streams within the Category I watersheds, which do not meet water quality standards, are published biannually in the 303(d) list. Subsequently, lakes and streams which appear on the 303 (d) list are scheduled to have a Total Maximum Daily Load (TMDL) prepared. KDHE is currently preparing TMDLs for impaired stream segments located within the highest restoration priority watersheds.

To restore water quality within the Category I watersheds, KDHE recommends the implementation of a Watershed Restoration and Protection Strategy (WRAPS). The ultimate goal of the WRAPS process is to create and implement a plan to restore the health of water bodies that do not meet their water quality standards. Additionally, the WRAPS process will insure that water bodies that currently meet their water quality standards are protected.

KDHE recommends that the WRAPS process be implemented on a local level by a Watershed Stakeholders Committee (WSC). The WSC would have the responsibility of working with local and state agencies to develop a WRAPS plan. This plan should identify the following: public outreach methods; required monitoring activities based on water quality goals and outcomes; specific water quality problems; watershed coordinator/evaluator; actions to be taken to achieve water quality goals and outcomes; schedule for implementation of needed restoration measures; and funding needs.

Streams and Rivers

HUC 8 11030014

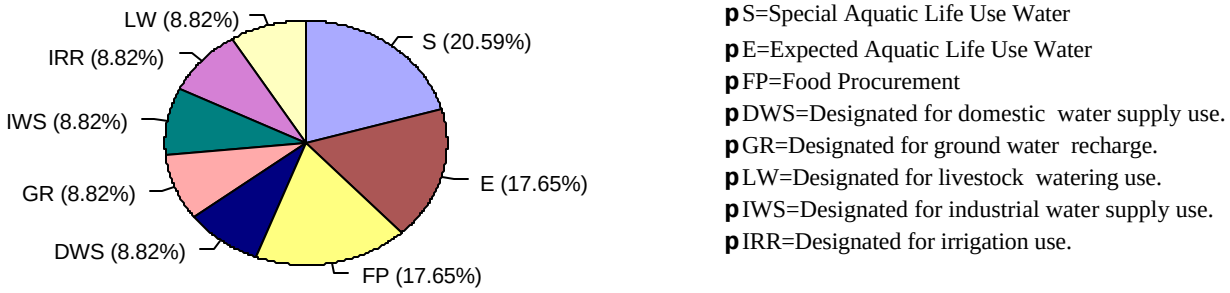
The Huc 8 11030014 watershed is ranked seventh in priority for watershed restoration throughout the state. According to the Unified Watershed Assessment, all of the streams and rivers miles sampled in this watershed meet their designated uses. The Ninnescah River, Red Rock Creek, and Dooleyville Creek are among the larger streams and rivers and most drain into the Cheney Reservoir. See Attachment 1 for a map of streams and rivers in HUC 8 11030014.

Designated Uses

There are 55 public water supplies within the watershed, few of which draw water from the local rivers. According to the Kansas Surface Water Register, the most common designated uses for streams and rivers in this watershed include: special aquatic life use, expected aquatic life use, and food procurement.

Figure 1

Huc 11030014 Surface Water Uses



TMDL/Contaminate Concerns

Streams and rivers throughout Kansas have been sub-divided into segments. By dividing the streams and rivers into segments they can be better analyzed and understood. A reach of river or stream may have segments which vary greatly in water quality, based on surrounding land uses.

Surface waters not meeting their designated uses will require total maximum daily loads (TMDLs). In this watershed, however, there are no stream or river segments requiring TMDLs. Currently, all the streams and river segments sampled in this watershed support their designated surface water uses. This watershed is ranked high in the Unified Watershed Assessment because of the water quality in Cheney Reservoir. Although these individual streams and rivers currently meet their designated uses, the cumulative effect of their pollutant loads contribute significantly to the water quality degradation of Cheney Reservoir.

Lakes & Wetlands

Huc 8 11030014 is the home to Cheney Reservoir and several smaller city and county lakes. Cheney Reservoir is used for public water supply, recreational purposes, and flood control downstream. See Attachment 2 for a map of lakes in HUC 8 11030014.

Designated Uses

According to the Surface Water Register, Cheney Reservoir is designated for expected aquatic life use, food procurement, domestic and industrial water supply, and contact recreational purposes.

TMDL/Contaminate Concerns

Surface waters not meeting their designated uses will require total maximum daily loads (TMDL)s. Cheney Reservoir requires two TMDLs. Primary pollutants for Cheney Reservoir are eutrophication and silt. Eutrophication is caused by excess nutrients from a variety of nitrogen and phosphorous sources including row crop agriculture, feedlots, septic systems, and urban/suburban runoff. Silt loading is a result of erosion as the bare soil enters the lake and settles to the bottom. Silt decreases water clarity and eventually decreases water storage capacity. Silt also carries phosphorous into the reservoir, which can accelerate eutrophication.

Potential Pollution Sources

Analyzing the surrounding land uses of Cheney Reservoir helps to understand which land uses might have greater influences on the source of the impairments. Below is a list of surrounding land uses. Grassland is considered grazingland for livestock.

- Urban Area... .04%
- Row Crop....21%
- Grassland....76%
- Wooded area....1%
- Water area....1.6%
- Other....0%

Based on the watershed's land use percentages, the primary pollutant sources for nutrients could be row crop agriculture, feedlots, and rural septic systems. Additionally, municipal waste water treatment plants and urban/suburban runoff may contribute significant amounts of nutrients into the watershed.

Feedlots: In Kansas, confined animal feeding operations (CAFOs) with greater than 300 animal units must register with KDHE. There are approximately 70 registered CAFOs located within HUC 8 11030014 (this number, which is based on best available information, may be dated and subject to change). Waste disposal practices and waste water effluent quality are closely monitored by KDHE for these registered CAFOs to determine the need for runoff control practices or structure. Because of this monitoring, registered CAFOs are not considered a significant threat to water resources within the watershed. A portion of the State's livestock population exists on small unregistered farms. These small unregistered livestock operations may contribute a significant source of fecal coliform bacteria and nutrients, depending on the presence and condition of waste management systems and proximity to water resources.

Wastewater Treatment Facilities: There are approximately 14 municipal and industrial wastewater treatment facilities within the watershed (this number may be dated and subject to change). These facilities are currently regulated by KDHE under National Pollutant Discharge Elimination System (NPDES) permits. These permits specify the maximum amount of pollutants allowed to be discharged to the "waters of the State". Due to the chlorination processes involved in municipal waste treatment, these facilities are not considered to be a significant source of fecal coliform bacteria; however they may be a significant source of nutrients.

Septic Systems: There are currently thousands of septic systems within the watershed and this number is increasing. When properly designed, installed, and maintained, septic systems can act as an effective means of wastewater treatment. However, poorly maintained or "failing" septic systems can leach pollutants into nearby surface waters and groundwater. The exact number of failing septic systems within the watershed is unknown; however the number may be increasing due to the current trends in suburban development. Local Environmental Protection Programs and County health departments may provide excellent sources of information regarding the proper design, installation, and maintenance for septic systems.

Wildlife: Wildlife located throughout the watershed are not usually considered a significant source of nonpoint source pollutants. However, during seasonal migrations, concentrations of waterfowl can add significant amounts of fecal coliform bacteria and nutrients into surface water resources.

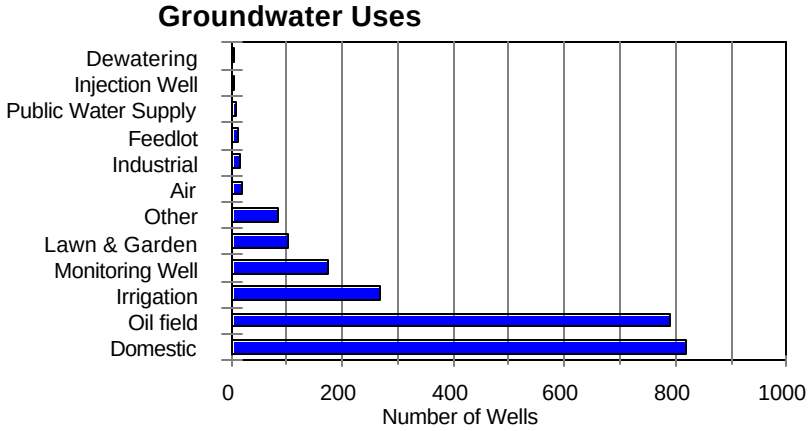
Row Crop Agriculture: As stated above, approximately 21% of the watershed's land is used for row crop agriculture. Row crop agriculture can be a significant source of nonpoint source pollution. Common pollutants from row crop agriculture include sediment, nutrients, pesticides, and fecal coliform bacteria. Many producers within the watershed regularly implement and maintain BMPs to limit the amount of nonpoint source pollutants leaving their farm. Some common BMPs include: the use of contour plowing; use of cover crops; maintaining buffer strips along field edges; and proper timing of fertilizer application.

Groundwater

Major groundwater aquifers underlying this watershed include portions of the High Plains and Dakota aquifers, and alluvial aquifers of the Ninnescah River and it's tributaries.

Designated Uses

There are approximately 2,312 groundwater wells located within the watershed. Water from these wells is used for domestic use, irrigation, feedlots, and industrial uses.



Aquifer Characteristics

High Plains Aquifer: Portions of the High Plains aquifer exist in the western portion of the watershed. Water from this aquifer is often used for irrigation. This water is typically hard to very hard but in good condition with no dominating pollutants.

Alluvial Aquifer: Alluvial aquifers of the Ninnescah River and it's tributaries exist throughout the watershed. Alluvial aquifers provide the primary water source for many public water supplies located within the watershed. Water quality in alluvial aquifers is generally good; however nitrates, minerals, pesticides, and bacteria can be pollutant concerns.

Dakota Aquifer:

Portions of the Dakota aquifer exist in the central portion of the watershed. Water from this aquifer is used for irrigation, public use, and rural-domestic water supply. Water from this aquifer is good; however chloride and sodium content increase with depth.

Potential Pollution Types and Sources

Common groundwater pollutants include: nitrates, chloride, sulfates, bacteria and atrazine. Nitrate impaired groundwater is perhaps the most prevalent groundwater contamination problem in the State.

Nitrate: Nitrate is a naturally occurring compound and is an essential component of all living matter. However, high concentrations of nitrate in drinking water can cause adverse health effects including "blue baby" syndrome. Sources of nitrate include municipal waste water treatment plant discharges, runoff from livestock operations, leaching of fertilizer from urban and agricultural areas, and failing septic systems.

Chloride: Chloride is a naturally occurring mineral found in Kansas lakes, streams, and groundwater. In high concentrations, chloride can cause deterioration of domestic plumbing, water heaters, and municipal water works. The primary source of chloride impacted groundwater is intrusion of salt water from deeper formations, often due to improperly constructed water wells which allow confined aquifers to come into contact with each other.

Sulfates: Sulfate is a naturally occurring mineral that can cause taste and odor problems in drinking water. Sulfates are dissolved into groundwater as the water moves through various sulfur containing rock formations.

Bacteria: Fecal coliform bacteria are found in the digestive systems of warm blooded animals. In the environment coliform bacteria is an indicator of potential disease causing organisms. Potential sources of bacteria contamination in groundwater include livestock facilities, septic systems, pets, and wildlife. Many wells are impacted by bacteria due to improper construction which allows water from the surface to funnel directly into the well.

Ammonia: Ammonia is a chemical which is toxic to fish and aquatic organisms. Sources of ammonia are livestock, septic tanks, fertilizer, municipal and industrial waste.

TSS: TSS stands for Total Suspended Solids which are particles such as soil, algae, and finely divided plant material suspended in water. Sources of TSS are soil erosion from cropland, stream banks, or construction sites, and municipal and industrial waste.

VOCs: Volatile Organic Compounds, also called purgeable organics, are components of fuels and solvents. They are ingredients in many household and industrial products. Sources of VOCs are leaking fuel storage tanks, trash dumps, and some agricultural pesticides.

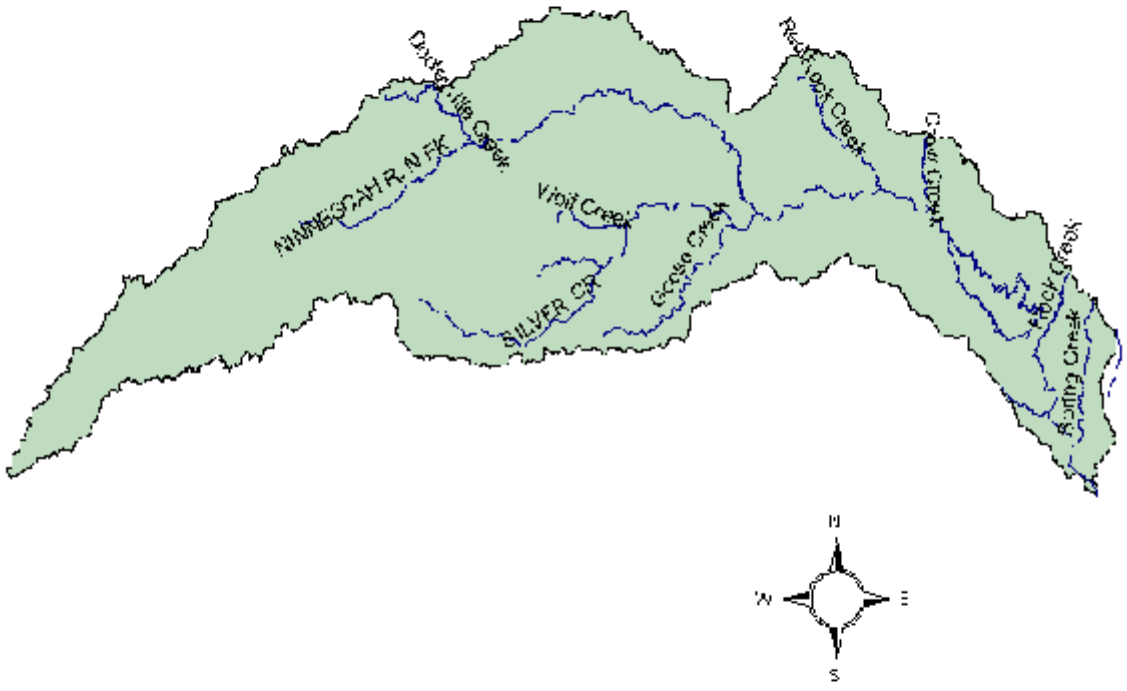
Iron: Iron is a naturally occurring element found in the soil throughout Kansas. It is an annoyance as it has an objectionable taste, causes a red stain to porcelain fixtures and laundry, and causes plumbing irritations.

Manganese: Manganese is a naturally occurring element and causes an unpleasant taste in drinking water, stains porcelain and laundry, and collects deposits in plumbing. It is naturally occurring throughout the soils in the state.

Attachment 1

Maps

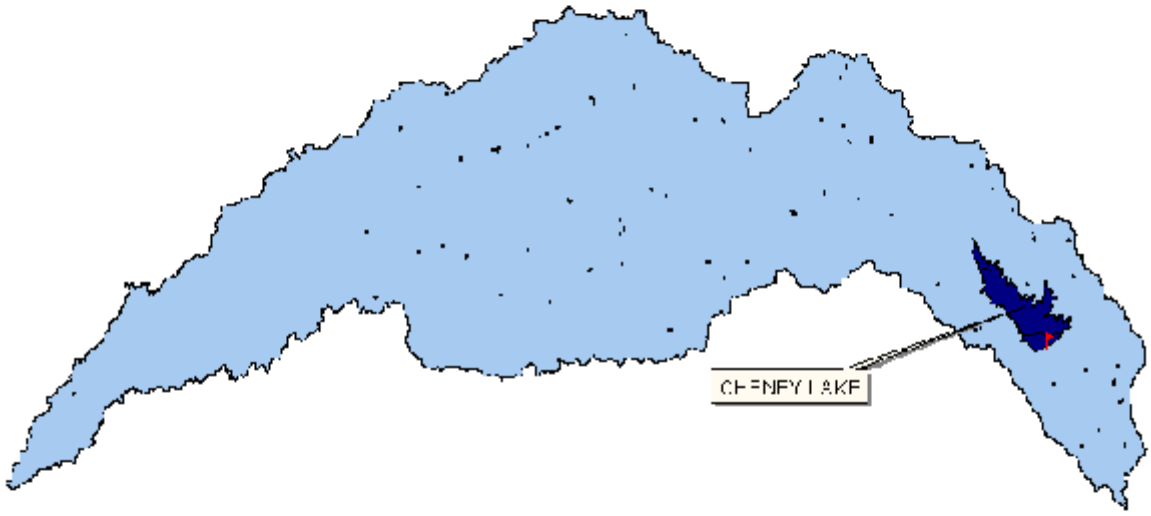
Huc -11030014- North Fork Ninnescah
Streams & Rivers

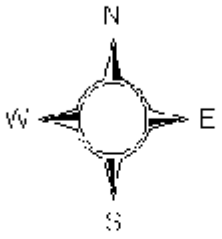


20 0 20 40 Miles

Streams & Rivers
Huc 11030014

Huc -11030014- North Fork Ninnescah Lake Monitoring Sites



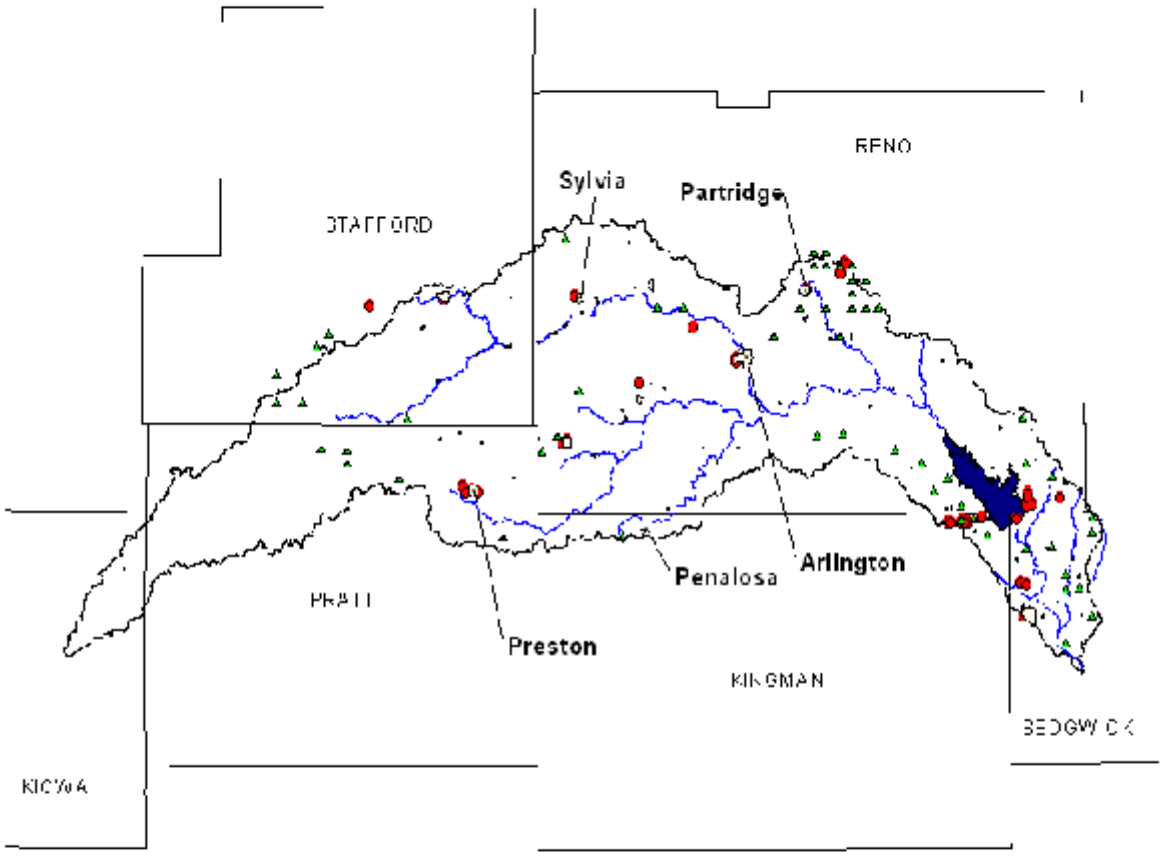


Lake Monitoring Sites

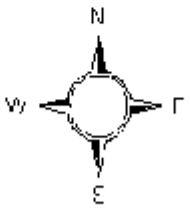
Lakes

Huc 11030014

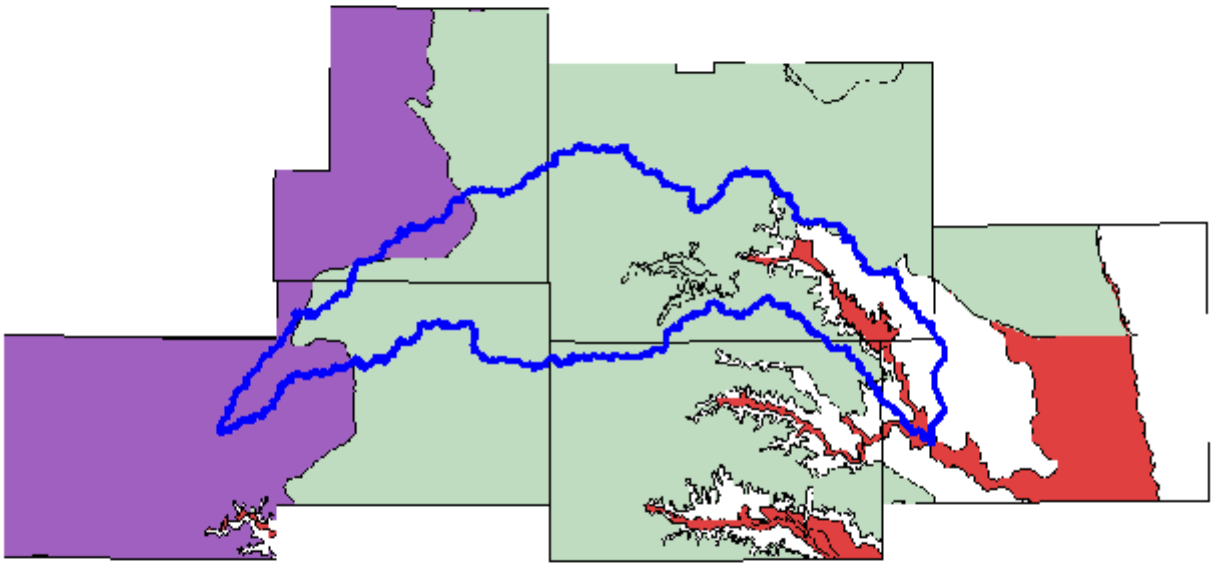
Huc -11030014- North Fork Ninnescah Watershed Boundary

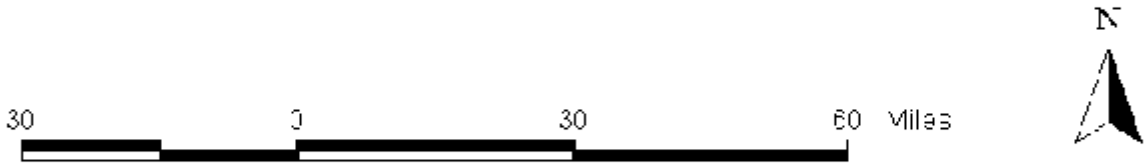


- Cities
- Feedlots
- Public Water Supplies
- Lakes
- Streams & Rivers
- Huc 11030014
- County Boundary



Huc 8 11030014 North Fork Ninnescah Groundwater Aquifers





Watershed Boundary
County Boundary
Dakota Unconfined Aquifer
High Plains Aquifer
Alluvial Aquifer

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19 November 2001
Jame Reseris